ENGG270

Circuits and Devices

S1 Day 2015

Dept of Engineering

Contents

General Information

Unit convenor and teaching staff
Unit Convenor
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Credit points
3

Prerequisites
12cp including (ELEC166(P) or ELEC170(P) or ENGG150 (P) or ENGG170(P))

Corequisites
MATH133 or MATH136

Co-badged status

Unit description
This unit develops the key skills in basic electronic theory and in aspects of laboratory investigation and reporting procedures. The unit covers modelling of passive and active electric circuit elements, and analysing circuits including these models. For passive circuits, topics covered are: ideal electrical components; energy dissipation and energy storage; Kirchhoff's laws; transient versus steady-state response; first-order and second-order circuits; and simple filters. Devices include voltage and current sources, resistors, capacitors, inductors and ideal operational amplifiers.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are

available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Apply fundamentals of circuit analysis with energy storage elements (transient response)

Apply impedance concept to determine ac circuit behaviour (frequency response)

Apply complex-power concept to determine power transfer in circuits

Use correct engineering techniques in practical experiments and reports

General Assessment Information

In order to pass this unit, students must achieve an overall pass mark (of 50%) and perform satisfactorily in all the assessment categories listed in the unit guide. Satisfactory performance means attending (or submitting) at least 80% of the assessment tasks and achieving at least 40% average on each task category over the semester.

Late submissions or absences from tests, laboratories, assignments and reports will not be accepted without a formal notice of disruption of studies and its approval.

Assessment Tasks

Name	Weighting	Due
Laboratory	25%	Weekly (see iLearn)
Assignments	25%	3 weekly (see iLearn)
Final Exam	50%	Will appear in exam calendar

Laboratory

Due: **Weekly (see iLearn)**
Weighting: **25%**

Laboratory sessions start in Week 2. They are compulsory for all students. Students are expected to arrive on time and use the laboratory time efficiently. It is not possible for students to switch their weekly session day without a formally approved "Special Consideration" at least a week ahead of time.

All laboratory sessions are based on learning outcomes and students are required to review the concepts introduced in lectures before coming to each session. Laboratory worksheets will be posted on iLearn prior to the weekly sessions and it is compulsory for students to complete the preparatory work before coming to the session.

Each student must have a bound notebook to be used as a laboratory/tutorial log (A4 size preferred, graph pages are not required). This logbook should also be used for any preliminary work. It should contain dates, calculations and results recorded during these sessions, in time

order. On the completion of each session, logbook entries must be signed and dated by a tutor. At the end of the semester the logbooks will be collected for final marking.

Food and drink are not permitted in the laboratory. Students will not be permitted to enter the laboratory without appropriate footwear. Thongs and sandals are not acceptable.

Students will prepare individual and original Laboratory Reports summarising their practical work of each module (three reports in total, 15% of overall mark of unit). A typical engineering-journal format will be used. Reports will be submitted electronically through iLearn and their originality will be tested by Turnitin.

On successful completion you will be able to:

- Use correct engineering techniques in practical experiments and reports

Assignments

Due: **3 weekly (see iLearn)**
Weighting: **25%**

Take-home assignments will be based on the key concepts being introduced at each learning-outcome-module (15% of overall mark of unit). Assignment questions will be posted on iLearn at the beginning of each module. Solutions may be hand-written but electronically submitted (check iLearn). All assignments should be prepared individually. It is expected that students consult staff or other students while learning the concepts, but copying assignments from others is not acceptable.

After the submission of each take-home assignment there will be a individual short test at the laboratory session (10% of overall mark of unit).

On successful completion you will be able to:

- Apply fundamentals of circuit analysis with energy storage elements (transient response)
- Apply impedance concept to determine ac circuit behaviour (frequency response)
- Apply complex-power concept to determine power transfer in circuits

Final Exam

Due: **Will appear in exam calendar**
Weighting: **50%**

A closed-book 3-hour examination will be conducted in the formal examination period.

On successful completion you will be able to:

- Apply fundamentals of circuit analysis with energy storage elements (transient response)
- Apply impedance concept to determine ac circuit behaviour (frequency response)
- Apply complex-power concept to determine power transfer in circuits

- Use correct engineering techniques in practical experiments and reports

Delivery and Resources

Text Book:

Svoboda & Dorf "Introduction to Electric Circuits", Wiley, 9th or 8th editions, electronic or printed versions.

Required unit materials:

- Text book
- Lecture notes and worksheets for laboratory sessions (available from iLearn)
- Bound logbook for all practical sessions

Technology used:

Typical electronic and electrical laboratory instruments such as voltage and current sources, voltmeters, ammeters, oscilloscopes, simulation software such as MATLAB, ORCAD, PSpice, and typesetting software such as Latex will be used.

Unit Schedule

The unit is composed of three modules directly related to the learning outcomes. Each module will run for three to four weeks and include weekly lectures, weekly laboratory sessions, one take-home assignment, one short test, and one laboratory report.

First two weeks of the unit is reserved for reviewing the learning outcomes of the previous unit, ENGG150. A short take-home assignment will be posted on iLearn in the first week of the Semester and a short test will be conducted in the first laboratory session to assess the background of the students.

A detailed weekly schedule of the unit will be posted on iLearn.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge,

scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Apply fundamentals of circuit analysis with energy storage elements (transient response)
- Apply impedance concept to determine ac circuit behaviour (frequency response)
- Apply complex-power concept to determine power transfer in circuits

Assessment tasks

- Laboratory
- Assignments
- Final Exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Apply fundamentals of circuit analysis with energy storage elements (transient response)
- Apply impedance concept to determine ac circuit behaviour (frequency response)
- Apply complex-power concept to determine power transfer in circuits
- Use correct engineering techniques in practical experiments and reports

Assessment tasks

- Assignments
- Final Exam

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative

in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcome

- Use correct engineering techniques in practical experiments and reports

Assessment tasks

- Laboratory
- Assignments

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcome

- Use correct engineering techniques in practical experiments and reports

Assessment task

- Laboratory

Changes from Previous Offering

The first module of the last offering of ENGG270 (on resistive circuit fundamentals) is converted into a two-week review period, as the last offering of ENGG150 largely covered it.

The second module of the last offering of ENGG270 (on resistive equivalent circuits) is removed to be covered after the ac circuits in other units.

The third module of the last offering of ENGG270 (on energy storage elements) is preserved and made into the first module of this offering.

The fourth module of the last offering of ENGG270 (on ac circuits) is preserved and made into the second module of this offering.

The last module of this offering (on ac complex power) is brought forward from the last offering of ELEC275.